REMARKS

Claims 1-4 and 6-8 are presently pending in the application.

Claims 1 and 8 have been amended to recite that the mean particle circularity is greater than 0.95 and less than 1 and is determined by a particle image analysis with a flat sheath flow utilizing hydrodynamics. Support for the method of determining the mean particle circularity may be found in the specification at least at page 12, lines 20-24. Support for the mean particle circularity being greater than 0.95 may be found at least in Examples 2-4. Further, it can be seen from Fig. 3 of the specification that it is not practically possible to prepare particles with a mean circularity of 1. Accordingly, no new matter has been added by these amendments, and entry is respectfully requested.

In the Advisory Action, the Examiner argues that Applicants' previous arguments are not persuasive. Specifically, Applicants previously argued that as the number of particles having a circularity of not greater than 0.85 decreases, the battery capacity, the percentage value C10A/C0.4A, and the capacity maintenance rate improve, as shown in Examples 1-3. However, the Examiner notes that comparing the battery of Example 3 (number of particles having a circularity not greater than 0.85 is 2.5%) to the battery of Example 4 (number of particles having a circularity not greater than 0.85 is 2.6%), the battery capacity increases, the percentage value C10A/C0.4A remains the same and the capacity maintenance rate increases by 1%. Furthermore, comparing the battery of Example 1 to that of Comparative Example 1 (both having circularity not greater than 0.85 equal to 10%), improved battery capacity, percentage value C10A/C0.4A, and capacity maintenance rate are observed in the battery of Example 1. The Examiner thus concludes that the arguments regarding particles having circularity less than 0.85 are inconclusive, and that Applicants have failed to establish results that are truly unexpected and significant. Accordingly, the Examiner maintains the rejection of claims 1-4 and 6-8 under 35 U.S.C. §102(e) as being anticipated by or under 35 U.S.C. § 103(a) as being obvious over each of U.S. Patents Nos. 6,358,648 of Hayashi et al. ("Hayashi") and 6,083,642 of Kato et al. ("Kato"). Applicants again traverse these rejections and the arguments in support therefore for the reasons set forth previously on the record, which Applicants rely upon in full, and for the additional reasons which follow, and respectfully request reconsideration and withdrawal of the rejections.

As previously explained on the record, the present invention relates to a positive electrode active material for an alkaline storage battery containing a nickel hydroxide powder and/or a nickel oxyhydroxide powder, in which the positive electrode active material exhibits particular physical properties, and a method of making a positive electrode using such a positive electrode active material. The positive electrode active material has a mean particle circularity of greater than 0.95 to less than 1, as determined by a particle image analysis with a flat sheath flow utilizing hydrodynamics, and the number of particles having a circularity of not larger than 0.85 accounts for not more than 5% of the total number of particles within the positive electrode active material. When preparing the active materials according to the invention, the temperatures of the raw material solutions are adjusted and carefully controlled. In contrast, despite the Examiner's assertion that Hayashi and Kato teach similar manufacturing procedures to those described in the present application, Kato and Hayashi do not teach or suggest such temperature adjustment. Thus, the active materials of the prior art differ from the active materials according to the invention.

It can be seen in Fig. 3 of the present application that it is impossible to produce nickel hydroxide powders which have a mean particle circularity of 1, that is, powders which are perfectly spherical. Thus, despite the fact that Hayashi and Kato both disclose "spherical" nickel hydroxide powders, it is extremely unlikely that such particles would be perfectly spherical and have a mean circularity of 1. Further, neither Hayashi nor Kato teaches or suggests a preferred circularity range for the nickel hydroxide particles. Hayashi only discloses that nickel hydroxide is prepared by mixing nickel sulfate and sodium hydroxide and then stirring (col. 3, lines 27-35). Kato teaches a method in which aqueous sodium hydroxide is slowly added dropwise to an aqueous solution containing nickel sulfate, cobalt sulfate, and zinc sulfate while adjusting the pH of the solution with aqueous ammonia, thereby depositing spherical solid solution nickel hydroxide particles (col. 11, lines 49-63). Thus, both references disclose the production of nickel hydroxide without suggesting a preferred circularity of the particles thereof.

Moreover, when particle circularity is not analyzed with a flat sheath flow utilizing hydrodynamics as described in the present application, but is assessed by merely determining the shape and aspect ratio from the images of some of the particles (as described by the Examiner in the February 25, 2004 Office Action), the difference in circularity cannot be statistically

distinguished. Only when particle image analysis is performed using the images of most particles of a nickel hydroxide sample is it possible to distinguish, for example, between the positive electrode active materials of Examples 2 and 3 and the positive electrode active material of Comparative Example 1. Using the claimed method of analysis, the images of most nickel hydroxide particles are captured by using a flat sheath flow utilizing hydrodynamics. Kato and Hayashi do not teach or suggest the claimed method of particle analysis and thus do not meet the requirements of the present claims.

Further, not only do Hayashi and Kato not teach or suggest the claimed mean particle circularity, these prior art particles would not exhibit the claimed circularities as follows. In order to obtain nickel hydroxide having a desired circularity, it is necessary to adjust not only the pH and mixing degree of the solution, but also various processing variables, such as reaction temperature, stirring speed and temperature of the raw material solution. When there is a preferred range of particle circularity, it might be obvious for one skilled in the art to adjust the processing variables accordingly. However, Hayashi and Kato do not teach or suggest a preferred range of particle circularity and thus one skilled in the art would not know, based on these references, how to adjust the processing variables appropriately, and thus could not have obtained nickel hydroxide having the claimed mean particle circularity.

In other words, since Hayashi and Kato do not recognize a parameter which needed optimization, mean particle circularity, nor the profound effect such a parameter would have on the resulting battery properties, one skilled in the art would not have been motivated to adjust the reaction conditions of the prior art production method in order to arrive at the claimed positive electrode active material. Rather, such an assumption which is made by the Examiner is merely hindsight from the present invention, and the positive electrode active material of the present application is indeed patentable over those taught by Hayashi and Kato.

Even if a case of *prima facie* obviousness had been established based on Hayashi or Kato, Applicants maintain that the present invention indeed demonstrates unexpected results which would overcome such a case. In the production of the battery of Comparative Example 1 (corresponding to prior art batteries), processing variables are not optimized and the temperatures of the raw material solutions are not adjusted when preparing the nickel hydroxide powder. This battery exhibits a mean particle circularity of 0.94 and the number of particles

having a circularity of not larger than 0.85 is 10%. In comparison, the batteries of Examples 2 and 3 according to the present invention exhibit improved battery capacity and thus meet the objective of the present invention (page 10, lines 3-12 of specification). In the batteries of Examples 2 and 3, the particles have a mean particle circularity of 0.96 and 0.97, respectively, and the numbers of particles having a circularity of not larger than 0.85 are 5% and 2.5, respectively. As shown in the Table below, the batteries of Examples 2 and 3 exhibited improvements in battery capacity of 4.6% and 6.3%, respectively, relative to the comparative battery.

	mean particle circularity	# of particles with circularity ≤ 0.85	battery capacity ($C_{0.4A}$)	increase in battery capacity relative to Comp. Ex. 1
Comp. Ex. 1	0.94	10%	2058 mAh	-------
Ex. 2	0.96	5%	2153 mAh	4.6%
Ex. 3	0.97	2.5%	2189 mAh	6.3%

Applicants respectfully submit that these are significant improvements in battery capacity. Since the field of nickel-metal hydride storage batteries is a mature field, there is little room for improvements in battery capacity. Thus, the fact that Applicants have developed a method for increasing battery capacity by as much as 6.3% by optimizing reaction conditions to adjust the shapes of the active material particles to particular circularities is in fact unexpected and significant and would not be expected based on the prior art.

In conclusion, Kato and Hayashi do not teach or suggest: (1) controlling the raw material solution at a constant temperature; (2) that the particle circularity of the active material is greater than 0.95 and less than 1 as determined by a particle image analysis with a flat sheath flow utilizing hydrodynamics, or (3) that the number of particles having a circularity of not larger than 0.85 accounts for not more than 5% of the number of total particles. Therefore, neither Kato nor Hayashi anticipates the present invention and one skilled in the art would also not arrive at the present invention based on the cited prior art. Since Hayashi and Kato do not describe a preferred range of mean particle circularity, they certainly do not suggest optimizing processing variables to arrive at the claimed levels. Further, the significant effects observed by the batteries

and active materials according to the invention relative to those in the prior art would overcome any *prima facie* case of obviousness, were one to be established.

For all of these reasons, Applicants respectfully submit that the pending claims are not anticipated by or rendered obvious over Hayashi or Kato, and reconsideration and withdrawal of the § 102(e) and § 103(a) rejections are respectfully requested.

In view of the above Amendments and Remarks, Applicants respectfully submit that the pending claims are patentably distinct over the prior art of record and in condition for allowance. A Notice of Allowance is respectfully requested.

Respectfully submitted,

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